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ABSTRACT

This paper, concerned with criteria for using instructional television and the ways to use it effectively in specific situations, calls attention to some developments that may not be familiar to adult educators. The author describes an evolving discipline divided on the meaning of "instructional technology" (gadgetry or systems approach?), and reviews the findings of research on instructional television as they apply to adult education. A program in American Samoa and the Open University of the BBC are cited as examples of large instructional design; discussing movements toward instructional designs in the U.S., the author describes and evaluates the Corporation for Public Broadcasting, the Commission on Instructional Technology, and the National Institute of Education. Programs of the Lister Hill National Center for Biomedical Communications receive close attention: satellite, cable, microwave, and wireline networks have been developed in support of health-care delivery, education, and research. The author concludes that "there is no point in trying to do what most instructional television programming for adults has tried to do," and he offers his own guidelines for adopting televised instruction. (AJ)

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# THE USE OF INSTRUCTIONAL TELEVISION IN ADULT EDUCATION: A REVIEW OF SOME RECENT DEVELOPMENTS

By: R. J. BLAKELY

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by

R. J. Blakely
Adjunct Associate Professor,
Adult Education, Syracuse University

January 1974

Syracuse University
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## FOREWORD

It is easy as well as a delight to write a foreword to Robert Blakely's monographs, for he always has something worthwhile to say and says it exceedingly well.

Besides being one of the best writers, Bob is probably the leading senior statesman in the field of adult education, who has consistently and constantly addressed himself to the issues and problems from a philosophical posture. He never loses sight of the humanistic dimension of education, and in that sense may be considered a proponent of "liberal education."

In the present monograph, Bob has given us his insights on the recent developments on the use of instructional television in adult education, together with a larger framework which helps us perceive the relative importance and implication of at least three developments for the adult educator.

One of Bob's concerns in this monograph was the consideration and treatment the National Institute of Education would give to adult education. He noted that the fate of the ERIC Clearinghouse on Adult Education would be a portent of what adult education may expect from NIE.

The fate of ERIC/AE has been decided now. NIE is phasing out ERIC/AE at the end of the current contract. Some of ERIC/AE scope of coverage, together with that currently handled by the ERIC Clearinghouse on Vocational and Technical Education was incorporated into a new ERIC Clearinghouse on Career Education, becoming operational September 1973.

ERIC/AE is grateful to Robert Blakely for his monograph, as well as to Ms. Doris Chertow and the Syracuse University Publications in Continuing Education for making this publication more widely available.

Stanley M. Grabowski
Director
ERIC Clearinghouse on Adult Education

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# THE USE OF INSTRUCTIONAL TELEVISION IN ADULT EDUCATION:

## A REVIEW OF SOME RECENT DEVELOPMENTS

This paper is written for adult educators by one who moves in both the field of adult education and the field of the mass media. Its purpose is to call attention to some developments that, my experience has revealed, may not be familiar to adult educators. The decision to review "some developments" rather than "the literature" was made after discovering two things about the literature: First, much of it is still concerned with proving that adults can learn from instructional television (which is no longer in doubt), and not much of it is concerned with the key questions of criteria for using instructional television and the ways to use instructional television effectively in specific situations. Second, some important developments have not yet entered the literature of adult education.

The parts that follow will treat (1) the development of the idea of instructional design; (2) some movements toward instructional designs in the United States; (3) the informational-communication systems of the National Library of Medicine; and (4) some implications of these three developments for the adult educator.

### I. THE DEVELOPMENT OF THE IDEA OF INSTRUCTIONAL DESIGN

#### A. An Evolving but Divided Discipline

One reason why two people often "talk past" each other when they discuss instructional television, or, more broadly, educational technology, is that they may mean different things by "technology." To one "technology" may mean machines; to the other it may mean a scientific, or at least a systematic, approach. Consider Galbraith's definition:

> Technology means the systematic application of scientific or other organized knowledge to practical tasks. Its most important consequence, at least for purposes of economics, is in forcing the division and subdivision of any such task into its component parts. Thus, and only thus, can organized knowledge be brought to bear upon performance.[1]

(It should be noted in passing that Galbraith's "economics" means the science of producing, distributing and consuming goods and services and, as such, includes communication and education.) According to this definition any "systematic application of scientific or other organized knowledge to practical tasks" is technology. Thus any person engaged in professional activities is engaged in technology. The educator who uses the lecture

and textbook is engaged in technology no less than the educator who uses television and computers. The question, therefore, is not by what means organized knowledge is brought to bear upon performance, but how effectively and efficiently it is brought to bear.

The question of how effectively and efficiently organized knowledge is brought to bear upon performance is being posed in all fields of public services. The American people are paying an aggravatingly burdensome percentage of their income for such services. They are not getting the results they expect. They are demanding increased effectiveness (that is, more purposeful results) and increased efficiency (that is, more economical results). Through their representatives--both governmental and non-governmental--they are demanding clear explanations of intended results before resources are committed and clear explanations of actual results after they have been expended. The demand for convincing explanations before and after--the heads and tails of accountability--is enforceable through the power of the purse.

The drive to be accountable--whether to one's own sense of professional responsibility or to external demands, or both--is inevitably a movement toward greater systematization of thought and action. The word "design" has been chosen as a short-hand term for systematic preparation and execution. It is appropriate in both its common meaning (deliberate purposive planning) and its specialized engineering meaning (the specifications of requirements for prescribed performance in prestated conditions). In "system engineering" the specifying of the criteria for a design that fits all parts into a whole is the turning point from the phase of analyzing and defining into the phase of synthesis and solution.

In this light, let us look again at instructional technology. A person to guide us from its past toward its future is Donald P. Ely.[2] He develops three statements of belief:

> 1. Instructional technology is not yet a discipline. A discipline is usually defined as an organized branch of knowledge. The field has not reached this state but there are strands from education, communications, and psychology which are beginning to merge.
>
> 2. The behavioural science concept of instructional technology is more valid than the physical science concept. The behavioural science concept holds that practice of instructional technology should be based on the dynamics of human behaviour while the physical science concept stresses the primacy of devices and procedures used as adjuncts to the presentation of ideas.
>
> 3. Technology offers the best organizing concept for the development of the field and its evolution into a discipline. While the word

> 'technology' is often maligned and misused, it is the concept which will permit a comprehensive and systematic schema to be drawn (p. 81).

Ely traces the "strands from education, communications, and psychology that are beginning to merge."

In education, key figures have been John Dewey, W. W. Charters, Edgar Dale, Charles F. Hoban, Jr., and James Finn. Finn set the stage for the 1960's, during which he championed the concept of instructional technology:

> The educationalist, in considering the effect of technology on the instructional process, must remember that, in addition to machinery, technology includes processes, systems, management and control mechanisms both human and nonhuman, and above all . . . a way of looking at problems as to their interest and difficulty, the feasibility of technical solutions, and the economic values--broadly considered--of those solutions. This is the context in which the educator must study technology.[3]

In communications, Ely traces the theories of Claude Shannon and Warren Weaver, Harold Lasswell, Wilbur Schramm, George Gerbner, and Marshall McLuhan. Then he remarks:

> The concept of communications helped the audiovisual field of the 1950's to move in new directions. It was easy to transfer the concern for the role of media in education to an emphasis on the communication of ideas. After all, wasn't the instructional technologist interested in improved communications? Wasn't the way to improve communication the intelligent application of media within the process? It seemed like a natural step in the evolution of the field. It provided a context in which to operate and, perhaps for the first time, distracted attention from the hardware of the field to the process in which it was used (p. 86).

In the psychology of learning, Ely begins with E. L. Thorndike and his student Irving R. Lorge, and then traces the work of B. F. Skinner, Mark May, Arthur Lumsdane, Neal Miller, and W. C. Meierhenry.

Strands from education, communications, and the psychology of learning are beginning to merge but, Ely says, they are divided by the physical science-behavioral science dichotomy:

> The distinction is more than an academic exercise. It goes to the roots of a fundamental difference between the technicians in the field and those who are instructional designers. The two areas call for different training in skills,

knowledge and attitudes even though they both deal with the same media. Each area must understand what the other is doing (p. 87).

Ely describes some current attempts at synthesizing the physical science and behavioral science concepts, and concludes:

> It all seems to make sense. The diverse branches of the field have been grafted to the trunk to form a new species. Some of the attempted transplants have been rejected, but those which have survived have enriched the product. We are not yet finished. New branches will be introduced and some will survive; some will die. The discipline is emerging even though it may not be fully developed. The behavioral science concept appears to be the predominant stance even though the physical science concept will survive. Technology as a systematic body of facts and principles related to a comprehensive and useful end is becoming the significant rallying point for the field (p. 92).

I have summarized and quoted from this article at length for two reasons: First, it gives a historical explanation of the gulf that exists between the field of adult education and the field of educational broadcasting--a gulf that must be bridged in the effective use of instructional television for adult education. Second, it lays the groundwork for presenting the results of research into the effectiveness of instructional television.

### B. The Findings of Research in Instructional Television

It lays the groundwork in that much of the significant research in instructional television was done by the men mentioned by Ely or by their students. It lays the groundwork in that the research follows the design of technology as a "systematic body of facts and principles related to a comprehensive and useful end." One of the outstanding researchers is Wilbur Schramm, who, Ely says, from the ideas of Shannon and Weaver, and Lasswell, developed his approach to communications, "which staked out an entirely new dimension in journalism-related research which was re-christened 'communication' research" (p. 86). Schramm is unquestionably the outstanding reporter of research in the effectiveness of instructional television. He wrote the first comprehensive review in 1962,[4] and also, with Godwin C. Chu, the second.[5]

Summarizing, Chu and Schramm say:

> . . . there is no longer any reason to raise the question whether instructional television can serve as an efficient tool of learning. This is not to say that it always <u>does</u>. But

> the evidence is now overwhelming that it can, and, under favorable circumstances, does. This evidence now comes from many countries, from studies of all age levels from preschool to adults, and from a great variety of subject matter and learning objectives. The questions worth asking are no longer whether students learn from it, but rather, (1) does the situation call for it? and (2) how, in the given situation, can it be used effectively? . . . (p. 177).

In the body of the review the authors give sixty statements of what the research says about learning from television. Most of them are quite specific, but two of them would advise against most of the uses that are made of instructional television in adult education:

> 4. Television is most effective as a tool for learning when used in a suitable context of learning activities at the receiving end.
>
> . . . hardly anywhere in the world is television being used to carry the whole weight of instruction. Almost invariably, where it is being used effectively, it is built into a teaching-learning system. The teaching that can be done best by television is provided that way; what can be done better by face-to-face teaching or group supervision is provided that way (p. 23).
>
> 5. Television is more likely to be an efficient part of an educational system when it is applied to an educational problem of sufficient magnitude to call forth broad support.
>
> It may well be the size, rather than the nature of the educational problem television is used to solve, which relates most closely to its efficiency (p. 28).

C. Two Examples of Large Instructional Designs

1. American Samoa

Chu and Schramm cite twenty-four case studies in which television is being applied "to an educational problem of sufficient magnitude to call forth broad support." Three of these were in the United States--the Hagerstown (Maryland) Public Schools, the Midwest Program for Airborne Television Instruction (MPATI), and the Chicago Junior College. None in the United States is listed under "adult education and community development." But one listed under "upgrading instruction," "teaching teachers," and "adult education and community development" has some relationship to the United States and yet is nothing more than a vague rumor to most American educators, including adult educators. This is the program in American Samoa.

In their review Chu and Schramm make no mention of the adult education and community developments of the Samoan program. They say only:

> American Samoa is trying to jump from a traditional rote-learning type of educational system into modern education--not in the hundred years or more it would ordinarily take, but in a decade or two. Almost its entire native teacher corps has come up through the traditional system and could not itself make such a dramatic change. Therefore, Samoa has consolidated its one-room schools, installed a six-channel television system, and brought in expert studio teachers to give the core of the curriculum. At the same time it is helping the Samoan teachers with in-service training and teaching materials to provide an adequate classroom context for the television and to improve upon their own preparation until they can handle a different level of teaching (p. 29).

American Samoa is a trust of the United States government. American experts in instructional technology advised the government and school system of American Samoa. Yet no adequate report of the Samoan program has appeared in the literature of the United States, in either the educational or the broadcasting fields. The Samoan experience has had profound effect upon some of the developing countries, such as the Ivory Coast, and some international agencies, such as UNESCO and the World Bank, yet it has not even received adequate reporting in the United States. The only detailed account is the one given by Schramm and others in the first volume of a set of four published six years ago by UNESCO and the International Institute for Educational Planning--where detailed accounts of the twenty-four case studies of large-scale application of television are given.[6]

### 2. The Open University of the British Broadcasting Corporation

Former Controller of Educational Broadcasting at the BBC, John Scupham, who was a member of the Planning Committee for the Open University and who now serves on its Council, has given us a lucid account of preparatory thinking. Between the publication of the White Paper of February, 1966 and the publication of the Report of the Planning Committee three years later, the name was changed from a "University of the Air" to the "Open University" because the Committee realized the hours of television would be sharply limited and the costs of television high. "Broadcasting must clearly be reserved for those functions which it was best equipped to carry out," Scupham says.

> The only method of individual instruction which can be made available everywhere, and is capable of indefinite extension to new subjects and new audiences, is correspondence tuition. For this reason, it was decided at an early stage that

> correspondence course techniques should provide the nucleus around which an integrated sequence of radio and television programmes, of discussion groups and of short residential courses could be built. There was, moreover, a great deal of evidence to suggest that it was in just such contexts that educational broadcasting could be most effective (p. 44).

In order to achieve a fit between the broadcasting component and the other components, the Open University had to achieve a fit between the academic and the production functions.

> . . . The pattern of operation adopted by the University pivots on the work of ad hoc groups called 'course teams.' Each course team is entrusted by the Vice-Chancellor with the total responsibility for one course. . . . Its task is to map out in detail the ground to be covered, and at the same time to decide how the various teaching methods at its disposal can best be used to attain its objectives. Its brief in that latter respect . . . is to set in motion 'teaching operations drawing on different media but using a "systems approach" with the learner as the key figure.' The course team, normally chaired by the dean of the faculty concerned, consists of his academic staff, but also includes senior representatives of those departments of the university primarily concerned with teaching methods. In each instance this group includes officers of the BBC. They are present not as narrow experts in a particular mode of educational communication, but as full course team members, and are able to make their contribution to the team's thinking about content, just as the academic staff may contribute to thinking about presentation. . . . (pp. 45-46).

> A systems approach in this field requires that one specifies educational objectives, and where that is possible to specify ways in which the attainment of those objectives can be assessed; to break down the student's task into its component elements of successive stages; to identify the learning processes involved; to consider the appropriateness of the teaching methods available in relation to each of the necessary operations; to combine those methods so that they form an integrated whole; and finally, to provide for feedback validation, and assessment. It is, in fact, to systematise somewhat more rigorously the practice of all good educational broadcasting. In that systematisation the course teams are likely, for the present, to find at least as much help in the experience and empiric observations of good practitioners as in

the largely repetitive body of research findings so far available. . . . (p. 46).

Scupham speaks of the various uses of broadcasts (radio as well as television) to provide a basis on which the student can build to achieve forceful initial exposition of a subject, to highlight or illustrate points of special difficulty, to refresh memory, to prepare for what is to come, to clear up difficulties, and so on. Then he comments:

> The fact remains that we know very little about the comparative fitness of the various media for any of these tasks. They can all teach, and on that subject Wilbur Schramm has perhaps said all that needs saying: 'Given a reasonably favourable situation, a pupil will learn from any medium--television, radio, programmed instruction, films, filmstrips, tape recordings, or other. This has been demonstrated by hundreds of experiments. In general, the same things that control the amount of learning from a teacher face to face also control the amount of learning from educational media among others, the relevance and clarity of the content, individual abilities, motivation to learn, attention, interest in the subject, respect and affection for the teacher, emphasis and replication of the central points to be learned, and rehearsal by the learner' (p. 47).

## II. MOVEMENTS TOWARD INSTRUCTIONAL DESIGNS IN THE UNITED STATES

### A. The Corporation for Public Broadcasting

The Corporation for Public Broadcasting, created by the Public Broadcasting Act of 1967, decided that educational broadcasting belonged within its responsibilities. This was contrary to the analysis and recommendations of the Report and Recommendations of the Carnegie Commission of Educational Television,[8] which had provided a blueprint for the legislation. The Commission Report said that television programming directed at the general community (largely cultural and public affairs programming) should be a national concern of public television, but that instructional television, directed at students in the classroom or otherwise in the general context of formal education, was another domain, and that informal adult education programming was "somewhere between." However, the Commission Recommendations were altered by Congress when it included radio in "public broadcasting," and changed again by the CPB when it decided to include "educational broadcasting" in its domain. Among the reasons were: (1) most of the stations in the "public broadcasting system" received a large percentage of their money from educational institutions for instructional broadcasting; (2) the prize showcase of public broadcasting from the beginning was "Sesame Street" (which was started before the PBC); and (3) the needs for

universal opportunities for continuing public education during the entire life span were too pressing to be ignored.

Therefore, early in 1969 the CPB commissioned the National Instructional Television Center to make a study of both the contemporary scene and future directions for Continuing Public Education Broadcasting (CPEB). Edwin G. Cohen, Executive Director of the National Instructional Television Center, has written an account of that study and its recommendations.[9] This section will merely report on the "contemporary scene" as it appeared in 1969 and note two of the recommendations.

NITC surveyed all public television and radio stations, selected a representative sample of reported programs; and assembled a panel of educational, broadcasting, and communication research specialists to inspect and discuss the sample. The following comments are based upon my opportunity, as a member of the panel, to view and listen to a wide range of programs for two days, to discuss them with my colleagues for another two days, and to read the background papers and final report of the NITC.

During the latest period for which documentation existed (May, 1968), continuing education programming accounted for two of fifty-six total broadcast hours (3.4 per cent) of the week's schedule for a typical public television station. Most of the series or comprehensive programs were produced by public broadcasting stations for their own use only; one-third of them were used by other stations; only five per cent were produced initially for national use, and most of these were in specialized areas of professional education.

Usually programs were initiated "to fill a need" which the station identified intuitively or some group in the community pressed for.

Most of the programs, radio and television both, were essentially lectures or illustrated lectures. Few provided opportunities for involvement.

The median audience for each continuing education program in radio was reported as 1,000 and in television as 10,000. Most programs were consistently directed to middle- and upper-class audiences.

There was little evidence that activities to accompany continuing education broadcasts were planned.

There was little evidence that the programs were developed with the aid of audience research.

Production costs of individual programs and series ranged, in radio, from $5 for a single program to $125,000 for a two-year series; in television, costs per program were reported from $100 to $5,000, with one 91-program series costing $625,000.

Television programming was financed (in order of importance) by stations, schools or universities, the Federal government, private agencies, state education departments, and foundations.

Cohen's summary is restrained:

> In general, consideration of today's continuing education programming resulted in two conclusions: It is largely irrelevant to the urgent social needs of America and, even if it were more relevant, its general approach to achieving desired results is inadequate (p. 9).

The NITC's general recommendation was that the Corporation for Public Broadcasting give leadership in a National Project to make a "systematized approach" to Continuing Public Education Broadcasting. There were eleven specific recommendations, of which two will be noted:

> 4. . . . That a systems approach be the basis for the essential activities of the National Project.
>
> Fundamentally, the National Project will be concerned with all of the factors that affect CPEB. . . . If programs are to achieve their specified purposes, production must be guided initially by audience characteristics, habits, and needs and, subsequently, by objective evidence of success or failure. Such requirements are best met by and within a systems approach as has been shown by the experience of CTW, NITC, and "Cancion de la Raza."*
>
> 8. . . . that research on the National use, effect, and consequence of all CPEB materials become an integral part of a comprehensive and permanent research activity that is independent of the National Project but that promptly and fully returns its findings to the Project.

* * *

The Corporation for Public Broadcasting also asked the International Council for Educational Development to investigate the ways in which the CPB could aid and promote the development of television and radio in education and instruction. The

*The Children's Television Workshop--producer of "Sesame Street" and "The Electric Company"; the National Instructional Television Center--through which various experts from various stations and universities draw up designs for instructional television programs, including "Ripples" (the early childhood awareness series); "Casa de la Raza" is a program for Spanish-speaking adults developed in Denver. See Mendelsohn.[10]

unpublished report of the study, Instructional Broadcasting: A Design for the Future, states in its first paragraph:

> During our investigation we came to realize that a solution cannot lie in the area of instructional broadcasting alone and that successful development of the great potential in instruction through television and radio required a fresh look at the whole educational system, both formal and non-formal. This is the essential theme of this report. Finally, we have stated our belief that instructional broadcasting will not come into its own unless it becomes a central part of a whole new system of education.

The CPB's decisions were reported in detail by John Montgomery,[11] manager of KDIN-TV and KIIN-TV, Des Moines, and also a member of the Board of Directors of the Instructional Services Division of the NAEB:

> . . . the Corporation for Public Broadcasting (CPB) has taken the lead to direct a national attack on improving the educational status of millions of citizens over 25 years of age who have not finished high school, but who have as a rule been exposed to classroom education through at least the eighth grade. It has instigated an Adult Learning Programs Service (ALPS) as an appropriate vehicle to serve this substantial audience. This endeavor is still at the exploratory stage. A final commitment has been made by the Corporation's Board of Directors only to fund STRIVE, the working title for the first of a proposed ten-year series of projects (p. 207).

The first page of Montgomery's article was face to face with the text of Richard Nixon's message of June 30, 1972, vetoing the bill to provide two-year support to the Corporation for Public Broadcasting. Since that time, of course, the Corporation has undergone two changes in its presidency and a change in the chairmanship of its Board of Directors. The fates of ALPS/STRIVE, of the Corporation for Public Broadcasting, even of the Presidency of the United States, cannot as of Summer 1973 be seen even through a glass darkly. However, it does appear certain that whatever public broadcasting will be supported in the United States will include a large component of instructional broadcasting, including instructional broadcasting for adults, and that the approach to instructional broadcasting for all age-levels of learners will be the "systems approach."

### B. The Commission on Instructional Technology

As was mentioned above, the Carnegie Commission on Educational Television did not study instructional television but

nevertheless emphasized its potential importance and recommended that "federal, state, local and private education agencies sponsor extensive and innovative studies to develop better insights into the use of television in formal and informal education." Title III of the Public Broadcasting Act of 1967 authorized the Secretary of Health, Education, and Welfare "to conduct . . . a comprehensive study of instructional television and radio . . . and their relationship to each other and to instructional materials . . .," but this title was not funded. In March, 1968 the Secretary appointed a nine-member Commission on Instructional Technology, which was given wide-ranging scope: "Every aspect of instructional technology and every problem which may arise in its development should be included . . ." The study was intended to lead to action. "We have reached the point where we have simply got to come up with more orderly, informed ways of taking advantage of all that the new technology has to offer." The Commission contracted with the Academy for Educational Development to do the staff work. The Commission reported in June, 1969.[12]

At first glance it is a strange report. It is not well organized. It is studded with quotations and anecdotes.* However, it seems more "psychologically logical" when it is looked at as an effort to influence the Administration and Congress rather than as a systematic review of the state and prospects of instructional technology. The goal is stated succinctly in the title, To Improve Learning. The concept of technology is in terms of human behavior, not physical devices. The Commission defined instructional technology to be

> . . . a systematic way of designing, carrying out and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication and employing a combination of human and non-human resources to bring about more effective instruction. The widespread acceptance and application of this broad definition belongs to the future. Though only a limited number of institutions have attempted to design instruction using such a systematic, comprehensive approach there is reason to believe that this approach holds the key to the contribution technology can make to the advancement of education. . . . a major obstacle to instructional technology's fulfillment has been its application by bits and pieces (pp. 19-20).

*The Report, indeed, is a convenient anthology of pungent quotations, with six pages of references. Moreover, it provides what is probably the best bibliography of the subject. An appendix lists 142 special papers that were prepared at the Commission's request and 81 others that were contributed. I had access to this collection for a week during 1969. Since then I have observed the papers slowly appearing in commercial and academic journals.

> In the conviction that technology can make education more productive, individual and powerful, make learning more immediate, give instruction a more scientific base, and make access to education more equal, the Commission concludes that the nation should increase its investment in instructional technology, thereby upgrading the quality of education . . . (p. 7).

"Thereby"? Only if the potential of instructional technology is developed. The actuality (the Commission underlines) is that "the present status of instructional technology in American education is low in both quantity and quality."

> Rather than taking hold and gaining followers through successful demonstrations, many ambitious projects have faltered and failed. Rather than boldly exploring fresh strategies to stimulate learning, most projects have merely translated existing curricula and teaching techniques into the newer media. Rather than fulfilling a functional role in a comprehensive approach to the design of instruction, most innovators have chosen or been forced to confine themselves to their own special medium or technique. Rather than moving into the center of the planning process in education, most technologically oriented educators are on its periphery (p. 21).

The Commission made six recommendations:

1. The establishment of the National Institutes of Education (NIE), reporting directly to the Assistant Secretary for Education, "to develop, support, and fund greatly strengthened programs in educational research, development and application (R. D. & A.)," both making grants to universities and other research institutions, and themselves conducting research, and sponsoring, among other things, several strong autonomous regional R. D. & A. centers, plus a few comprehensive demonstration projects. (Analogies are the National Institutes of Health, the Agricultural Experiment Stations, and the Cooperative Extension Service.)

2. The establishment, as a constituent part of the NIE, of a National Institute of Instructional Technology (NIIT), "to improve American education at all levels through the use of instructional technology," with focus on R. D. & A. in equipment, instructional materials, and systems, and also in training personnel. The NIIT should "strengthen and promote the most promising of the Research and Development Centers and Regional Educational Laboratories."

3. Leadership by the NIIT "in efforts to identify, organize, and prepare for distribution the high-quality instructional materials, in all media, capable of improving education."

4. Support by the NIIT of "demonstration projects designed to improve instruction through the wise exploitation of technology. These projects should be concentrated initially on a few carefully selected communities or individual schools--including urban ghettos, impoverished rural areas, and communities with populations that are predominantly black, Mexican-American, Puerto Rican, or Indian."

5. Initiative by the NIIT "in encouraging the development of programs to improve the capacity of educators to make more effective use of instructional technology and programs to train specialists."

6. Leadership by the NIIT "in bringing businessmen and educators together in a close working relationship to advance the productivity of education through technology."

C. The National Institute of Education

The National Institute of Education (NIE) came into being August 1, 1972, with the broad legislative mandate "to seek to improve education . . . in the United States." The first proposal related to a national institute of education had been made in 1958 by an advisory board appointed by the National Academy of Sciences/National Research Council. In 1964 the Panel on Educational Research and Development of the President's Science Advisory Committee recommended that "institutional arrangements" be made "for the initiation and managements of new research programs and for the dissemination of results." In 1969 David Krathwohl, Dean of the Syracuse University School of Education, then President of the American Educational Research Association (AERA), proposed National Institutes of Education separate from the Office of Education, with both agencies reporting to a newly created post of Assistant Secretary for Education. Six months later the Commission on Instructional Technology, in its report, To Improve Learning, made the recommendations that have been summarized above. Much of the substance of these proposals was included in President Nixon's 1970 education message. "As the first step toward reform, we need a coherent approach to research and experimentation. Local schools need an objective national body to evaluate new departures in teaching that are being conducted here and abroad and a means of disseminating information about projects that show promise." Legislation to create the National Institute of Education was introduced in the 91st Congress, was passed by the 92nd, and was signed by the President on June 23, 1972.

The arrangements are now familiar. Title III of the Act establishes an Education Division in the Department of Health, Education, and Welfare, headed by an Assistant Secretary for Education. This Division includes the Office of Education and the National Institute of Education, both reporting separately to the Secretary of HEW "through" the Assistant Secretary. Sidney P. Marland is Assistant Secretary for Education. Thomas K.

Glennan, Jr., is director of the NIE. Within the NIE Harry Silberman is director of the planning unit. With the confirmation by the Senate on June 7, 1973, of the appointment of the 15-member National Council on Educational Research, which is to formulate general policies for the Institute and to prescribe the director's powers and duties, the National Institute for Education was under sail--enjoying, at least for a time, a favorable position in both the Presidential Budget and Congressional appropriations.

On February 23, 1973, the National Institute of Education published "A Brief Outline of Its History, Status, and Tentative Plans," from which the following selective summary is made.

The tentative status of program planning, as well as programs transferred from the Office of Education, can be broken down into four general areas: (1) a "visiting scholars" activity, (2) basic studies, (3) research and development and utilization system, and (4) programmatic research and development. Most of the plans pertinent to adult education seem to fall under (3) and (4).

Under (3), "Research and Development and Utilization Systems," the NIE plans (a) to strengthen the research and development system by undertaking "studies aimed at determining how NIE can attract high quality people into education-related R&D and develop support systems to enhance their work"; (b) to link research to practice by conducting dissemination and utilization activities; and (c) to disseminate research and development findings. The paragraph under that last heading follows:

> NIE also plans to continue to support and improve efforts distributing education research and development findings to the field. The largest on-going activity in this area is ERIC . . . an educational document retrieval system which provides quick access to education literature. NIE hopes to maintain ERIC and at the same time close gaps in present coverage, develop standardized management procedures for the ERIC clearinghouses . . . ; and insure that the clearinghouses can respond and contribute to NIE dissemination programs. In addition, NIE will examine the criteria used by the clearinghouses to select documents for the ERIC system, conduct a cost analysis of ERIC, and study ways to promote feedback to ERIC designers and managers to make the system more relevant to its users.

Under (4), "Programmatic Research and Development," seven general categories of activities are given: relationship between learning and work; school-initiated experiments; curriculum development; personnel, organization and management; postsecondary; early learning; and minority concerns.

Relationship Between Learning and Work: . . . career education has been defined as the development of knowledge, abilities, and attitudes to help individuals and groups obtain, hold, and advance on a job or series of jobs that constitute a career. In 1973, NIE will review the laboratory programs and four "models" transferred from the Office of Education. New activities will emphasize the relationship between learning and work, particularly as it applies to young people's career entry and adults' career progression. The four models deal with (1) developing career education K-12 curriculum units across all subject levels, (2) exploring and developing the actual workplace as a locus for education, stressing interaction between youth and adults, (3) expanding and improving the options of home-based adults for employment in the future, and (4) providing rural low-income families with career education in a residential setting to improve their employability and standard of living.

Curriculum Development: One major set of activities will involve the use of a National Aeronautics and Space Administration Advanced Telecommunications Satellite (NASA ATS/F) to provide career education and early childhood instruction to residents of isolated areas in the Rocky Mountain States, Alaska, and Appalachia.

Post-Secondary Education: These programs are designed to strengthen institutional capability by developing improved management and communications systems which can be used by higher education administrators. One project is designed to improve instructional relevance to junior colleges; another is developing first and second year college courses for broadcast over educational television.

A bibliography of the various papers commissioned by the NIE planning unit, copies of NIE's enabling legislation, and general information about NIE's activities are available from the Office of the Director/Office of Public Information, National Institute of Education, Code 600, Washington, D.C. 20202.

* * *

Before we leave the NIE, several observations should be made. One is to note that the NIE is a single institute, not institutes, as proposed by Dean Krathwohl and the Commission on Instructional Technology, following the analogy of the National Institutes of Health. Krathwohl proposed a

> . . . central coordinating staff which would, like the NIH, work with a series of institutes, each focused on a critical education problem. . . . It would carry out the program largely by working with those educational institutions, industries, and laboratories with appropriate capabilities. In-house research would be carried on only if there were clear advantages. Problems around which an institute would be constituted could be as broad as urban education, or as circumscribed as the program now carried on by the Bureau of the Handicapped.

The National Commission on Technology recommended:

> The National Institutes of Education should comprise several constituent institutes, through which grants would be made to universities and other independent research institutions. The institutes would also conduct research themselves. The NIE should sponsor, among other things, several strong autonomous regional R. D. & A. centers, plus a small number of comprehensive demonstration projects (p. 39).

The difference between an Institute and a series of institutes may or may not be important. On the one hand, the mandate from Congress is so general and the legislated structure of the National Institute is potentially so flexible that the difference between a series of institutes and a series of programs might not be consequential.

On the other hand, the tendency toward centralization within all institutions is strong. Will the preference be, as Krathwohl proposed, for carrying out in-house research "only if there were clear advantages"? In agencies--public or private (such as foundations)--where a choice lies between grant-giving or in-house operating, the tendency is <u>not</u> to "let George do it." Objective evaluation of the work of the sources of support is unlikely. The criteria for deciding whether to give grants or to conduct in-house research and, when grants are made, how much autonomy to permit will be crucial. These criteria will be set by the National Council on Educational Research and the Director of the NIH.

A second observation is that the NIE does not include a National Institute of Educational Technology, as recommended by the Commission on Educational Technology. Again, this may or may not be important. On the one hand, the Commission's own definition of "technology" is so broad that any systematic application of knowledge to an end may be considered "technology." On the other hand, whether the stress is upon systematic <u>knowledge</u> or systematic application of knowledge is a crucial difference.

This point leads to a third observation: The February 23, 1973, outline of the history, status, and tentative plans of the NIH does not explicitly acknowledge that the crux of the problem of reforming American education is strategies that would lead to the reform of the system from within, rather than those that seek to modify it from without. Certainly it is true, as Roger Levien points out in a Rand paper, "National Institute of Education: Preliminary Plan for the Proposed Institute" (which is available from the NIE), that "lack of knowledge is a major impediment to achieving improvement and reform in American education," and that "Educational R&D is necessary to gain the knowledge needed for educational improvement and reform." But it is no less true that a great deal of knowledge is available and not used because of institutional and individual resistance to change. This fact is clearly evident in all three of the areas of DHEW: The economics and politics of the fields of health, education, and welfare are far greater obstacles to reform than lack of knowledge.

A final observation is that careful readings of the tentative statement issued by the NIH, which has been summarized above, and of the few remarks available from Director Thomas K. Glennan, Jr. do not give me confidence that adult education will be regarded as important in its own right. Emphasis will be upon the "relation between life and work." Who can quarrel with such emphasis? However, life is more than work. Emphasis will be upon "career" education. Nowhere do we read a clear recognition that the goal of all education for all aspects of life is self-directed life-long learning.

These four remarks are observations only. They are not prejudgments of a new institution that as of July, 1973 has just had its policy-making body appointed and approved. But, on the other hand, initial attitudes set the direction in which new institutions go. The fact is that the only explicit recognition of adult education made in the tentative statement is under the revealing subhead "post-secondary education." The fact is that only two projects are mentioned; one is "designed to improve instructional relevance in junior colleges"; another is designed to develop "first and second year college courses for broadcast over educational television." These facts are ominous. The decision concerning the fate of the ERIC Clearinghouse on Adult Education, not yet final as this paper is written, will be a portent of what adult education may expect from the National Institute of Education.

While one may hope that the National Institute for Education and the Office of Education will regard and treat adult education as a field of study and a field of practice in its own right, historically the Federal Government has given support to adult education to achieve a specific objective or mission.[13] Unless the course of that history is altered by policies and agencies not yet in sight, the greatest opportunities for adult educators to use modern technology for communication and instruction will be, not in the field of education

as such or the area of adult education as such, but in other fields in which the education of adults is instrumental to the achievement of specific objectives or missions.

The field where modern technology has been applied to communication and education on the largest scale and in the most imaginative way is the field of health care. The next part of this review describes some of the activities of the National Library of Medicine. The justification is simply that adult educators should be familiar with these developments.

## III. THE LISTER HILL NATIONAL CENTER FOR BIOMEDICAL COMMUNICATIONS

The purpose of the Lister Hill National Center for Biomedical Communications is to adopt existing techniques and to develop new computer and communication technologies for incorporation into operational biomedical communications networks in support of health-care delivery, education, and research.

The sections that follow are digests of parts of the report to Congress of the first three years of operation of the Lister Hill Center.[14] The report and the monthly National Library of Medicine News are available without charge to persons writing to the NLM's Office of Public Information, 8600 Rockville Pike, Bethesda, Md. 20014.

### Satellite Networks:

The Alaska experiment is the use of a communication satellite to connect isolated communities with physicians, thus providing needed consultation and direction. Medical traffic has been carried two hours per day, seven days per week since August 1971. Services provided are voice consultation between community health aides and physicians at Native Health Service Centers; continuing education of health aides, nurses, and physicians; education of villagers in personal health matters; and communications between hospitalized patients and their families in native villages. The purpose of the Alaska Experiment is to determine which useful services can be provided by voice communications. A similar network is planned for Micronesia, the Trust Territory of the Pacific Islands, and the American Samoa; ground stations on at least three islands will be linked to the major medical, educational and library resources of the University of Hawaii by way of the ATS-1 satellite. ATS-1 is a low-powered satellite capable of transmitting only narrowband information--that is, including voice but not video.

### Cable Television Networks:

The Lister Hill Center supported efforts to establish pilot projects in which CTV is incorporated into

health-care delivery systems and educational programs. The purpose of the experiment is to reach people in urban ghetto areas through their use of television. Programs are directed at improved patterns of self-care of the chronically ill and disabled, at education dealing with personal and community health, and at participation in entry into the health-care system. Experiments are in Denver and New York City.

Neighborhood health centers in Denver have proven valuable in the delivery of health care to the lower socio-economic strata of the city. Two major health clinics provide medical and administrative support to six neighborhood health centers. The cable system provides particularly valuable support to these small clinics or centers, which may depend for primary care principally on allied health professionals.

The Mt. Sinai-East Harlem project of New York City is an attempt to develop a unique patient and public information and education system. Mt. Sinai Medical Center has accepted responsibility for the health care of East Harlem. Historically the Center has developed its programs and policies around the three elements of health-care delivery, medical education, and research; it has now included a fourth element--representation from the consumer population to broaden support for the community-oriented health-care systems. The cable television network is expected to be useful in all four of the elements.

New England Microwave Network:

Full two-way interactive television is perhaps the only technology for bringing the medical school classroom to the small community hospital and simultaneously bringing the community health professional to the university classroom. Doctors in the community hospital can now participate in grand rounds with their university colleagues. Nurses in coronary care units can share instruction and experiences in patient care. University faculty members can teach nursing students at the University Hospital and a small local vocational school simultaneously. All these activities are under way with an experimental microwave television link connecting Dartmouth's Medical School and University Hospital of Hanover, N. H., with Clarement General Hospital in Clarement, N. H., 30 miles away. In 1972 construction was begun on a mountaintop microwave network that would extend the network both to the medical school of the University of Vermont, in Burlington, and the Central Vermont Hospital in Berlin. Plans were made to extend the television services to other institutions in 1973--using a van-mounted microwave unit to reach several small hospitals and clinics.

Wireline Networks--MEDLINE:

In October, 1971 the National Library of Medicine began MEDLINE (MEDLARS On-Line) to provide an on-line bibliographic searching capability for libraries at medical schools, hospitals, and research institutions throughout the country. MEDLINE allows almost instantaneous searching of the medical literature. MEDLINE was made possible by the success of AIM-TWX (Abridged Index Medicus) by way of the Teletypewriter Exchange Network, begun early in 1970.

For AIM-TWX, citations to articles published during the last five years in over 100 journals are stored in the large, time-sharing computer of the System Development Corporation, Santa Monica, Calif. The larger MEDLINE data base consists of about 400,000 citations to articles from more than 1,000 journals indexed since January 1, 1969, operating on the NLM IBM 370/155 computer. In March, 1973 MEDLINE service began to be provided on a regular basis from the Computer Center of the State University of New York (SUNY), thus offering additional capacity to meet the need for MEDLINE service and to provide a backup when NLM's computer is down.

NLM supports and manages a nationwide data communication network to facilitate access to the service by authorized users. Access is achieved via telephone lines, teletype, TWX, and other terminals. The communications network enables users in more than 35 major cities (nodes) to reach the computer at the cost of a local telephone call; users elsewhere pay only the charges to the nearest node.

Eleven Regional Medical Libraries provide the managerial and document-delivery skeleton to the MEDLINE network. Other medical libraries are provided access upon giving evidence of a previous service record to scientists and practitioners within their communities both within and outside their own institutions.

MEDLINE service is just the beginning of many services to be provided by the Data Communication Service. Since mid-1972 a variety of diagnostic systems and computer-aided instruction have been available. Thus medical students, physicians, and allied health professions have access to an increasingly sophisticated repertoire of information services and other aids through the Data Communication Service. Among these are computer-aided instruction systems.

Wireline Networks--Computer Simulation Projects:

Among the many uses of computers are as aids in teaching, review, giving and scoring examinations, and simulating patients. Until the advent of the Lister Hill

Center's Biomedical Data Network (part of the larger Data Communications Service), such computer programs were used mostly on the campuses where they were developed. In November, 1970 the NLM began the organization of a biomedical communications network for interinstitutional cooperation and sharing of computer resources.

The present system of examining physicians for their qualifying "Boards" by assembling them in the same place is costly. The National Board of Medical Examiners and a number of specialty boards, including the American Board of Internal Medicine, have been exploring the possibility of giving these examinations by computer to candidates at remote sites. Consideration is being given to the use of the Lister Hill Center's Biomedical Data Network as a means to develop and transmit examination materials and to provide instructional materials for dentists, nurses, and allied health professionals.

## IV. IMPLICATIONS FOR ADULT EDUCATORS

A consideration of "the use of instructional television in adult education" led away from television and away from adult education to the core question--how human beings learn--and to the central task--the systematic application of knowledge to the process of human learning in order to help specific human beings in specific situations achieve specific learning objectives. This would have been the destination we would have arrived at, whether the starting point had been "the use of computers (or whatever) in adult education" or "the use of instructional television in early childhood education (or whatever)." Insofar as technology, narrowly defined, diverts attention to physical devices and away from the issue of achieving desired changes in human behavior, it is pernicious. Insofar as technology, broadly defined, helps a comprehensive and systematic approach to be made, it is helpful.

The implications of this conclusion and of the several developments that have been traced in this review can be stated either negatively or positively. Negatively, the implications are that there is no point in trying to do what most instructional television programming for adults has tried to do (judging from the wide range of research findings that Chu and Schramm reviewed in 1968 and from the wide range of actual programs that the National Instructional Television Center panel reviewed in 1969); that is, there is no point in translating the traditional lecture into television format to meet ill-defined needs for ill-defined learners. Such efforts can be characterized, in the words of Edgar Dale, as concentrating on doing better what perhaps should not have been done at all. The acceptance of this implication is at least a negative gain in that it will save resources.

Positively, at least, four guidelines can be stated. The first concerns what criteria to use for adopting televised instruction, whether for children or adults.

> It seems to us that the discriminating tests are two: the teaching/learning task involved must be intensely valuable, even critical, to contemporary educational operations; the task could not be performed as well--if at all--without television.[15]

The "state of the art" paper from which that quotation is taken continues:

> What seems to be different about television, in concert with other electronic means of communication (e.g., radio, audio, facsimile, computer-managed-instruction), is that it affords the possibility of operating instructional systems that are organized, authoritative, scientific and effective. And it can do so, if properly designed, in a manner that places in a central position, at least, the needs and requirements of the learner.

These criteria imply the other three guidelines. The second and third have been quoted from Chu and Schramm and the fourth was developed by Scupham:

> Television is most effective as a tool for learning when used in a suitable context of learning activities at the receiving end.
>
> Television is more likely to be an efficient part of an educational system when it is applied to an educational problem of sufficient magnitude to call forth broad support.
>
> The course teams will first of all have to consider in each instance the functional relationship between broadcasting and the other teaching elements of the course.

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